

# THE SHEPHERD

A GUIDE FOR SHEEP AND FARM LIFE

October, 2002





# Dairy Sheep Breeds for Possible Use in North America

Dr. M. H. Fahmy, International Genetic Consulting Service  
Ottawa, Ontario, Canada



East Friesian ewe and her triplet lambs

North American sheep breeders are discovering an aspect of sheep production that their counterparts in the rest of the world have been exploiting for decades, that is milk production. The development of the sheep cheese industry and the recent availability of a superior dairy breed in North America made the difference. One possible rea-

son that this industry has not been developed earlier is that there has not been a real dairy breed before the importation of the East Friesian almost a decade ago.

East Friesian is by far the most productive known dairy breed that exists on the planet at this time. As the following table illustrates, its performance in dif-

ferent countries surpasses any other local breed, hence its wide spread importation by various countries with developed or developing dairy sheep production. In addition to their high milking ability, East Friesian ewes are also prolific averaging more than two lambs per litter and lambs show a superior growth potential. Wool is classified as medium type with a spinning count of 48s-52s, fibre diameter of 40m and staple length of 11-20 cm. Yearling ewes produce 3 kg of fleece, whereas ewes 2 year and older produce 3.6-6.2 kg. Lambs weigh 4.0-5.2 kg at birth, gain 145 g daily to 40 kg, and subsequently 286 g daily to 200 days of age. Body weights of mature rams and ewes are 90-120 kg and 57-75 kg, respectively.

Would that make East Friesian the ideal breed for dairy and meat production any where in North America? Not really, because East Friesian animals are very sensitive to environmental, management and nutrition elements. They are well adapted to harsh climactic conditions and mountainous terrains, prosper in the outdoors, and are most common in humid areas. These sheep are not productive under dry and/or hot conditions but are suitable for farming at sea level or in areas where rainfall is frequent. The East Friesian sheep have an inherent potential for increased milk, lamb and wool production, however, sparse feed and unimproved pastures may fail to meet their nutrient requirements, resulting in lower levels of production. So it is clear that East Friesian is not a suitable breed for southern and mid-western USA and Canadian Prairies.

Fortunately there are breeds in the world that can thrive under these dry and hot conditions and they can contribute to the genetic diversity of the available dairy breeds. In this article I shall present briefly some of these breeds that are gaining popularity in various regions of the world with similar environmental conditions.

## Chios

Chios is a semi fat-tailed breed possibly the descendants of crosses among sheep indigenous to the Island of Chios and western Anatolia. These highly productive stall-fed sheep are raised primarily for milk production.

Chios sheep adapt well to a wide range of ecological and climactic conditions within the broader Mediterranean region. However, these sheep are not recommended where severe adverse and difficult conditions prevail. Fertility and milk yield decline in Chios sheep raised under dry, windy or cold climactic conditions.

Table 1 Estimates of milk yield of East Friesian in various countries

Country	Milk Yield	Lactation Length, Days
Germany	540-650 kg 283-680 l	-- 212-264
United Kingdom	450 l	--
Sweden	250-350 kg	--
Bulgaria (experimental conditions)	343 l (1st) 311 l (>1st)	-- --
Greece	178-183 kg	140-170
Uruguay	196 l	235
Israel	161 kg	198
Saxony Province (Germany)	388-551 kg	--

Chios sheep are predominantly white with black or brown spots around the eyes, and on the extremities of the ears, nose, belly and legs. The head is relatively small and delicate with a light to moderately convex profile and sometimes completely black in colour. The ears are long, horizontal and slightly droopy. In general, rams have long spiral horns and ewes are polled. There is a small proportion of ewes with small curved horns. Chios sheep have a long and narrow neck. The legs are long, and fine boned. The tail is 24-27 cm long, cone-shaped, with a 9-12 cm broad base extending to the hocks. On the Island of Chios, body weights of mature rams and ewes are 65-80 kg and 48-52 kg, respectively.

The head, legs and belly and sometimes the neck are bare. The fleece of rams and ewes weighs 2.2 and 1.2-1.9 kg, respectively. The wool appears to be uniform, but the quality tends to vary with a spinning count of 44-56s, staple length of 8-13 cm, breaking strength of 20-24 g and extensibility of 45-63%. Ram lambs weigh 3.8 kg at birth, 16 kg at weaning (42 days), 44 kg at 150 days, and 51 kg at 180 days of age. Corresponding weights for ewe lambs are 3.5, 13, 35 and 37 kg.

Ewe lambs exhibit puberty at 243-290 days of age as body weight reaches 37-43 kg. The mean onset of estrus occurs in late July and the breeding season lasts from April to November. Ovulation rate averages 3.25, and duration of estrus 1.8 days with an estrus cycle of 17-18 days. Fertility is about 91%, and prolificacy ranges from 1.7 under conventional management to 2.0 under improved conditions. Preweaning lamb mortality is about 6.2% for singles; 7.2% for twins; and 9.8% for multiple births.

Chios ewes produce on an average, 120-300 kg of milk annually. In Turkey, ewes produced 120-180 kg under commercial establishments but these averages increased to 188-259 kg of milk under experimental conditions. In Cyprus, ewes produced 119 kg of milk in the first 90 days of lactation, and 105 kg more in following 104 days of lactation. In Greece, following a suckling period of 40-60 days, ewes produced 180-200 kg of milk annually. In a study of 4,000 ewes, 28% produced 3 kg of milk or more daily, 28% produced 2-3 kg and the remaining ewes produced 1-2 kg. Outstanding ewes produced up to 500 kg of milk. The highest milk production recorded for a ewe was 597 kg in 272 days during the second lactation. On the Island of Chios, ewes produced milk containing 5.9-6.8% fat and 5.5% protein. In general, lactation length varied between 150 and 200 days according to the prevailing management.



**Chios ram in Greece**

Chios ewes have a typical dairy conformation with a large pendulous udder and a high inclination of teats that cause problems during machine milking. Large udders may have two additional teats that are often milked. In milking ewes, the average udder circumference before and after milking was 48 and 36 cm, respectively; udder depth was 23 cm; and teat length and diameter were 4.3 and 2.3 cm, respectively.

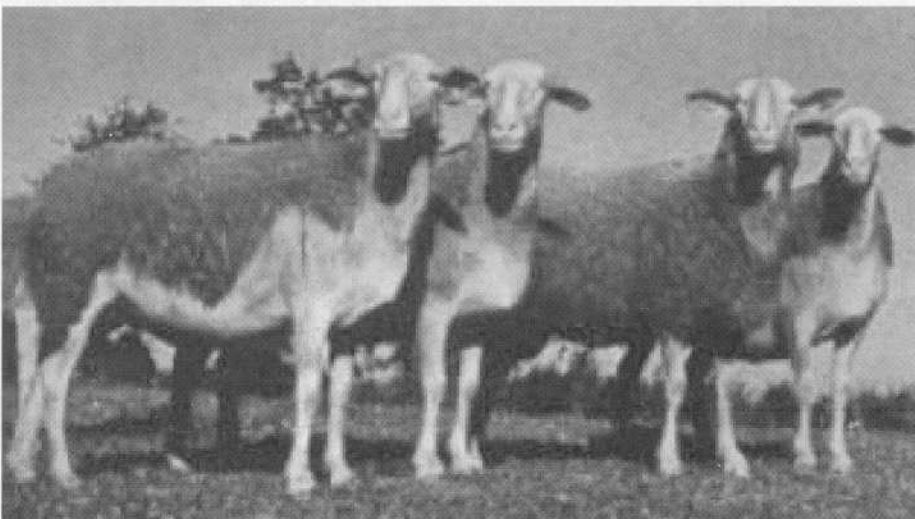
#### **Lacaune**

The Lacaune breed was named after a town in the Lacaune mountains. In 1870, in an effort to improve the milk production potential, Merino, Southdown and Barbary breeds were crossed with Lacaune sheep. This action has had little influence on the breed. The Lacaune sheep, noted for milk production, have been raised widely across central and

southern France. These sheep are maintained in flocks of 50-100 ewes and almost two-thirds of the population are milked.

Lacaune sheep are generally white or yellowish-white in colour, however, some are pigmented. Wool covers the body except the head, nose, abdomen and legs. The head is long with a straight or slightly convex profile. The forehead is triangular and both sexes are polled. The eyes are large and light in colour with long, horizontal ears located sideways and drooping to a very slight degree. The face is covered with white hair while the neck is round and arched. The sheep are 70-80 cm in height with a long trunk and a straight back. The legs are medium in length.

The Lacaune breed is classified as a semi-coarse woolled sheep with short, thick, elastic locks and a more extensive



**Lacaune ewes in France**



semi-closed fleece. The fleece is dense, crimped, springy, strong, white in color and fairly fine weighing 2.5 kg in rams and 1.5 kg in ewes. The fleece has a spinning count of 58-60s, fibre diameter of 20-28 mm, fiber length of 7-10 cm, and breaking strength of 12 g. Twinning is common and lambing occurs from December to March. Usually, ewes continue to lactate until July. Lambs weigh 3-4 kg at birth. On dairy farms, lambs weighing 10-16 kg are marketed at 30-45 days of age. Lambs sold for meat vary in weight from 25-30 kg at one month to 40-50 kg at three months or 50-60 kg at 12 months. Body weights of mature rams and ewes are 95-100 kg and 70-75 kg, respectively.

Lacaune sheep have been intensively selected for milk production. Results from the 2000 Milk Recording Program showed that yearlings up to 18 months of age produced 225 liters in 146 days of lactation whereas older ewes produced 287 liters of milk in a 172 days of lactation. For ewes of all ages, the yield was 270 liters in 165 days. The milk contains 5.2% protein and 7.1% fat. The primary product of this breed is milk, used in manufacturing Roquefort cheese. The production of meat and wool is also common. There are many specialized varieties of Lacaune sheep that have been selected for both milk and meat production.

#### **Improved Awassi**

The exact origin of Awassi sheep is unknown, however, it is widely believed that their evolution occurred in the region between the rivers Tigris and Euphrates in Iraq and Syria. The name

Awassi comes from an ancient Arab tribe (El-Awas) that lived near the Euphrates river in northern Syria. These sheep, classified as fat-tail, carpet-wool type, are raised primarily for milk, lambs and wool.

The Awassi sheep are well adapted to the hot and dry subtropical climate. These sheep are good walkers capable of travelling over extended distances in search for food and water. Nevertheless, it is important to provide shelter as a safeguard against cold and humidity, especially snow. In the semi-arid and arid regions of southwest Asia. Awassi sheep are raised under extensive management. Furthermore, these sheep are highly productive under intensive management and adequate feeding.

In the beginning of the 20th century, indigenous Awassi sheep from Turkey and the Middle East were imported into Israel. An accelerated breeding program based on selection for increased milking ability resulted in the development of the improved Awassi breed. These sheep with potential for increased milking ability have been exported to several countries in Europe, Middle East and New Zealand.

The improved Awassi population are medium to large in size. The predominant colour is white while the head, ears, and upper part of the neck may be reddish-brown. In order to eliminate rudimentary ears and coloured fleece, selection against these undesirable characteristics was rigorous. The legs are totally or partially brownish in colour. Although rams are characterized by

large, spiral and strong, wrinkled horns, there are a small number of polled animals. The majority of ewes are polled, however, 25% of the population may have short straight horns or scurs. The ears are long and pendulous, and sometimes small, rudimentary or absent. The tail is broad, round, medium-sized and bi-lobed with a fat cushion that is bare under the surface and extends to the hocks. The middle of the tail is narrow, woolled and bent upwards, ending in a short, thin appendix.

Rams and ewes produce heavily-medullated fleece weighing 2.0-2.5 kg and 1.8 kg, respectively. The fleece has a spinning count of 36-46s, staple length of 15-20 cm and fibre diameter of less than 26 mm in 43% of the fleece, and more than 36 mm in 28%.

Ewe lambs are usually bred at 8-16 months of age. Birth weights of ram and ewe lambs averages 4.9 and 4.5 kg for singles, and 4.1 and 4.0 kg for twins, respectively.

In Israel, the average production of improved Awassi ewes in 1979 was 342 liters of milk in 200 days of lactation with 6% milk fat. Selection increased milk production over a period of five years from 378 to 444 kg in yearlings, and from 473 to 532 kg in two-year old ewes. In year 2000, the Official Milk Recording Program estimated milk yield at 530 liters. In Spain, 22% of Awassi ewes imported from Israel produced up to 200 kg of milk. Similarly, 49% produced 201-300 kg, and 25% produced 301-400 kg of milk. In Iran, ewes produced 222 kg of milk in first lactation, 268 kg in second lactation and 298 kg in third and subsequent lactations. In India, yearlings produced 231 kg of milk in 323 days of lactation. Milk fat content varied between 5.5 and 9.8%, while SNF content varied between 9.4 and 10.8%.

Uniform udder characteristics in improved Awassi ewes are a result of selection for mechanical milking. The udder is globular shaped, well-attached, moderate in depth, wide between the legs, elongated anteriorly and extends well to the rear. The teats face downward and are of fair length and moderate thickness.

#### **Newly developed dairy breeds**

The majority of the new breeds of dairy sheep were developed from crosses between East Friesian and indigenous sheep. The development programs were undertaken mainly because East Friesian-cross sheep failed to sustain increased milk production potential and/or crossbreeding caused the deterioration of characteris-



**Improved Awassi rams in Australia**

tics considered desirable in the indigenous sheep.

#### **Assaf**

The Assaf breed was developed in Israel from crosses between Awassi and East Friesian breeds. Average production of Assaf ewes is 333 liters of milk in 180 days of lactation. The ewes are also moderately prolific producing 1.6 lambs at birth. Assaf sheep, recognized for its milking ability under arid and semi arid conditions have been exported to Abu Dabi, Jordan, Portugal, Spain and Peru.

#### **British Milksheep**

The British Milksheep was developed in England with 70% East Friesian, 10% Blue-faced Leicester, 10% Polled Dorset, 5% Lleyen and 5% from a composite of three breeds. The primary objective was to produce rams for use as terminal sires, to mate with ewes of different breeds raised in varying environments. The resulting cross-bred offsprings were expected to be highly productive. The British Milksheep is a robust, active, tough, hardy and docile sheep that can adapt to the surrounding environment. These sheep are medium to large in size and polled, with a white face and legs. Fleece weight averages 6.5 kg in rams and 4.5 kg in ewes. The semi-lustre wool has a spinning count of 50-54s with a staple length of 15-17 cm. British Milksheep ewes are highly prolific, producing 2.2 lambs as yearlings, 2.6 lambs as 2 year-olds, and 3.1 lambs as mature ewes. The ewes produce 650-900 liters of milk in 300 days of lactation. The milk solids are particularly high with protein content rising from 5% in early lactation to 7.5% in late lactation, and fat content rising from 5.5 to 9%.

#### **FSL**

In France, a breeding program was initiated in 1967 to produce a super dairy breed by combining three dairy breeds: the East Friesian, Sarda and Lacauene breeds into a composite population, the FSL breed. The East Friesian breed, which excels in prolificacy and milk production was crossed with the Sarda breed, noted for ease of milking, and the Lacauene breed contributing genes for hardiness and meat quality. The back crosses of  $\frac{3}{4}$  East Friesian x  $\frac{1}{4}$  Lacauene, and  $\frac{1}{4}$  Sarda x  $\frac{1}{4}$  Lacauene were mated to produce a population composed of 37.5% East Friesian, 37.5% Sarda and 25% Lacauene. During the first stage of development ewes produced 175 liters of milk in 210 days of lactation.

#### **Rideau**

The Rideau breed was developed in Canada to perform under intensive



**Assaf ewe**



**Rideau ewe and her triplet lambs**

management. The development started in 1966 with a foundation stock consisting of ewes and rams from several British breeds, Ile de France, Finnsheep and East Friesian with a final combination consisting of 40% Finnish Landrace, 46% British breeds and 14% East Friesian. Rideau sheep are generally white, although colour spots may appear on head and legs. Mature body weight for rams is 80-100 and for ewes 70-90 kg. Ewe lambs weighing 47 kg can be bred at seven months to lamb at one year of age. Under intensive systems, ewes can lamb at 8-month intervals with conception rate of 55-57% for ewe lambs and

80-82% for adult ewes. Prolificacy is 1.7 lambs for yearlings and 2.5 for adult ewes. Multiple birth accounts for 82% of all litters. Lambs weigh 3.4 kg at birth and about 36 kg at 118 days of age. Rideau ewes machine milked twice daily for about 120 days, following weaning at 30 days produced milk containing 6.6% fat, 5.8% protein and 4.8% lactose.

With the advances in embryo transfer techniques and recent simplification of importing regulations, these breeds can be imported easily into North America. The role they can play in the American dairy sheep industry can be far reaching.